Attachment A

Preconservation Scenario

Preconservation Scenario

As part of the cumulative effects analysis, Reclamation has analyzed the 1983 conservation program that Westland initiated. Westland and the CTUIR agreed that Reclamation would analyze the impacts of this program; however, it is not part of the proposed action in this environmental assessment.

A Preconservation Scenario was analyzed using the RiverWare™ model to determine the effects of water conservation practices that occurred in the Westland Irrigation District (Westland) in 1983. This scenario was compared to the No Action Alternative to estimate impacts to flows in the Umatilla River as a result of these water conservation practices. Impacts to the Umatilla River were realized in the following locations along the Umatilla River: (1) Upstream of the Westland Diversion. Impacts are due to differences in the timing and magnitude of storage water releases from McKay Reservoir. These differences reflect the different management scenarios of the Preconservation Scenario and the No Action Alternative. (2) Downstream of the Dillon Diversion. Impacts are a result of differences in the timing and magnitude of return flows from Westland.

Modeling Assumptions and Methodology

The modeling assumptions, inputs, and methodology used in the Preconservation Scenario were the same as those used in the No Action Alternative model run with the following exceptions and/or additions:

1. Canal seepage in the Westland North RiverWare subarea set to 40 percent to reflect preconservation conditions. This canal delivers water to 3,150 in-boundary acres that receive McKay storage water as a supplemental water supply.

2. Water deliveries to the Westland North subarea were increased to overcome seepage losses. In other words, gross water deliveries (pre-canal-seepage) to Westland North were greater per acre than the rest of Westland to achieve the same net delivery (post-canal-seepage) amount throughout the district.

Storage water that was used by out-of boundary lands in the Full Adjustment Alternative (OB storage water) was used by in-boundary lands in the Preconservation Scenario. The same method that was used in the No Action Alternative was used in the Preconservation Scenario to deliver the OB storage water.

Figure 1 shows average monthly potential crop irrigation requirements and average monthly modeled depletions for in-boundary lands. These depletions represent average monthly depletions for the Preconservation Scenario for years 1994 through 2002 after the apportionment of the OB storage water.

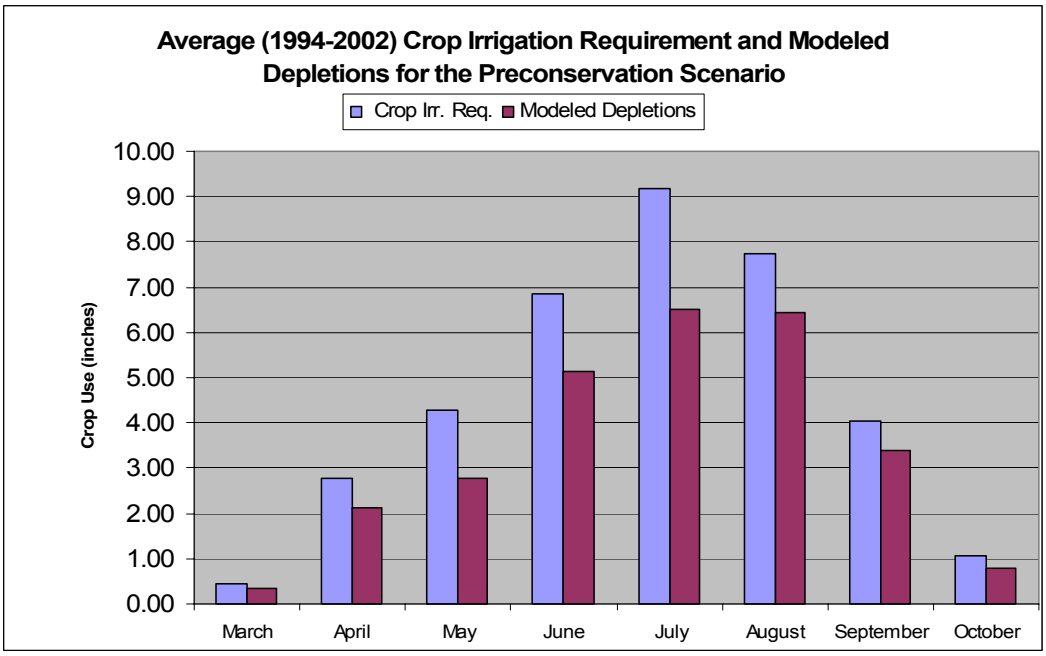

Figure 1: Average (1994-2002) monthly potential crop irrigation requirements and average monthly modeled depletions for in-boundary lands for the Preconservation Scenario.

The modeled results of the Preconservation Scenario were compared to the modeled results of the No Action Alternative to estimate the magnitude and timing of any impacts to the Umatilla River and to McKay Creek. Impacts to the Umatilla River were realized in the following locations.

> **Upstream of the Westland diversion:** Impacts are due to differences in the timing and magnitude of storage water releases from McKay Reservoir. These differences reflect the different management scenarios of the modeled alternative and scenario.
>
> **Downstream of Dillon diversion:** Impacts are a result of differences in the timing and magnitude of return flows from Westland.

It is important to note that the projected downstream and upstream impacts are generated by a single action, boundary adjustment, and are not independent effects of separate actions.

Impacts Upstream of Westland Diversion

Impacts to the Umatilla River upstream of the Westland Diversion, as a result of conservation practices, are due to the differences in the magnitude and timing of storage water releases from McKay Reservoir. Table 1 shows the modeled average monthly differences in diversions (1994-2002) at Westland Diversion for the Preconservation Scenario when compared to the No Action Alternative. There are relatively minor differences in monthly diversions, and the annual diversion volumes are equivalent for both the Preconservation Scenario and the No Action Alternative. These differences in diversions are realized upstream of the Westland Diversion in the Umatilla River and in McKay Creek.

Table 1.—Modeled average monthly (1994-2002) flow and volume diversion differences between the Preconservation Scenario and the No Action Alternative at the Westland Diversion

Average of all years	Pre-conservation Scenario	
	Flow difference (average daily, cfs)	Volume difference (acre-feet)
January	0.0	0
February	0.0	0
March	0.0	0
April	0.0	0
May	0.0	0
June	-5.2	-309
July	-6.9	-423
August	10.8	662
September	1.8	105
October	-0.6	-35
November	0.0	0
December	0.0	0
Annual		**0**

Impacts Downstream of the Dillon Diversion

Impacts to the Umatilla River, downstream of the Dillon Diversion are due to differences in return flows from Westland. The differences in return flows are mainly attributed to differences in diversions and differences in canal seepage. Table 2 shows the modeled average monthly differences in return flows (1994-2002) from Westland, as measured in the Umatilla River upstream of the West Extension Irrigation District (West Extension) diversion for the Preconservation Scenario, when compared to the No Action Alternative. Return flows are higher for the Preconservation Scenario because of higher canal seepage returns.

Table 2.—Modeled average monthly (1994-2002) flow and volume return flow differences between the Preconservation Scenario and the No Action Alternative as measured in the Umatilla River upstream of the West Extension Diversion

Average of all years	Preconservation	
	Flow difference (average daily, cfs)	Volume difference (acre-ft)
January	3.5	212
February	2.9	160
March	2.3	141
April	2.5	149
May	3.7	225
June	4.6	276
July	6.2	381
August	7.7	475
September	9.3	553
October	8.0	495
November	6.0	354
December	4.4	269
Annual		**3,690**

Modeled Flows at Various Locations along the Umatilla River

Modeled impacts to the Umatilla River and McKay Creek were examined for years 1994 through 2002. The actual historical flows (1994-2002) at Umatilla River at Yoakum (YOKO), Umatilla River below Feed Diversion (UMUO), Umatilla River below Dillon Diversion (UMDO), Umatilla River at Umatilla (UMAO), and McKay Creek below McKay Reservoir (MCKO), adjusted to include 10 cfs minimum flow below McKay Reservoir, reflect operations that include deliveries to OB lands under TWSCs. This "current" operation includes conditions that would be similar to those that would occur under full boundary adjustment. Therefore, these historic flows will be used to estimate the flows that would occur under the Full Adjustment Alternative.

The period 1994-2002 contains a range of water supply conditions that can be used to review a typical dry, average, or wet year scenario. The years 1995, 1996, and 1997 were wet years; 1999, 2000, 2002 were average years; and 1994, 1998, and 2001 were dry years. Years of a similar category were averaged together to obtain mean monthly flows for wet, average, and dry years To estimate the flows at these points along the river for the No Action Alternative, subtract the full impact from the historic flows. To estimate the flows at these points along the river for the Preconservation Scenario, add the preconservation impact to the No Action flows.

YOKO (Umatilla River at Yoakum)

Estimated flows at YOKO, which is upstream of the Westland Diversion, are shown in table 3 for the No Action Alternative and the Preconservation Scenario and for wet, average, and dry years. Table 4 shows mean volume differences between the scenarios. The differences in flows at YOKO are due to differences in the magnitude and timing of McKay storage water releases. This explanation of flows at YOKO is true for any point on the Umatilla River from McKay Creek to the Westland Diversion and for McKay Creek downstream of McKay Reservoir.

Table 3: Estimated mean flows at Yoakum for wet, average, and dry years for the No Action Alternative and the Preconservation Scenario.

	YOKO, Umatilla River at Yoakum (RM 38), average daily flows (cfs)					
	Wet year		Average year		Dry year	
Month	NA	Preconserv	NA	Preconserv	NA	Preconserv
Jan	1361.7	1361.7	744.2	744.2	619.6	619.6
Feb	2513.4	2513.4	834.4	834.4	433.5	433.5
Mar	1977.0	1977.0	1415.7	1415.7	1095.3	1095.3
Apr	1843.3	1843.3	1625.4	1625.4	1044.6	1044.6
May	1558.0	1558.0	801.1	801.1	870.0	870.0
Jun	458.1	452.4	476.4	470.2	434.1	428.7
Jul	280.8	273.2	253.5	247.4	256.3	247.1
Aug	245.3	257.0	201.5	211.2	208.7	223.2
Sep	210.3	214.0	185.0	186.9	179.8	180.0
Oct	237.1	234.8	226.2	226.8	201.5	201.3
Nov	445.4	445.4	240.1	240.1	347.6	347.6
Dec	902.6	902.6	345.7	345.7	765.9	765.9
Annual difference (acre-ft)		**0**		**0**		**0**

Table 4: Mean volume differences at YOKO for wet, average, and dry years for the Preconservation Scenario when compared to the No Action Alternative

Month	YOKO , Umatilla River at Yoakum (RM38), volume differences (acre-ft)					
	Wet year		Average year		Dry year	
		Preconserv		Preconserv		Preconserv
Jan		0		0		0
Feb		0		0		0
Mar		0		0		0
Apr		0		0		0
May		0		0		0
Jun		-340		-370		-320
Jul		-466		-374		-570
Aug		723		594		891
Sep		223		113		13
Oct		-140		37		-14
Nov		0		0		0
Dec		0		0		0
Annual difference (acre-ft)		**0**		**0**		**0**

UMUO (Umatilla River downstream of Feed Diversion)

Estimated flows at UMUO, which is upstream of the Westland Diversion and downstream of the Feed Diversion, are shown in table 5 for the No Action Alternative and the Preconservation Scenario and for wet, average, and dry years. Table 6 shows mean volume differences between the scenarios. The differences in flows at UMUO are due to differences in the magnitude and timing of McKay storage water releases.

Table 5: Estimated mean flows at UMUO for wet, average, and dry years for the No Action Alternative and the Preconservation scenario.

Month	UMUO, Umatilla River downstream of Feed Diversion (RM 28), average daily flows (cfs)					
	Wet year		Average year		Dry year	
	NA	Preconserv	NA	Preconserv	NA	Preconserv
Jan	1226.3	1226.3	681.5	681.5	568.8	568.8
Feb	2363.1	2363.1	721.5	721.5	292.9	292.9
Mar	1547.6	1547.6	1250.7	1250.7	841.9	841.9
Apr	1412.8	1412.8	1486.3	1486.3	790.8	790.8
May	1138.9	1138.9	759.5	759.5	700.2	700.2
Jun	334.3	328.6	465.3	459.0	362.4	357.0
Jul	196.2	188.6	236.0	229.9	200.8	191.6
Aug	172.8	184.5	189.6	199.2	169.0	183.5
Sep	153.0	156.7	175.0	176.9	158.8	159.0
Oct	241.8	239.6	221.7	222.3	195.1	194.9
Nov	476.8	476.8	248.3	248.3	307.4	307.4
Dec	851.6	851.6	358.0	358.0	659.4	659.4
Annual difference (acre-ft)		**0**		**0**		**0**

Table 6: Mean volume differences at UMUO for wet, average, and dry years for the Preconservation Scenario when compared to the No Action Alternative

Month	UMUO, Umatilla River downstream of Feed Diversion (RM 28), volume differences (acre-ft)					
	Wet year		Average year		Dry year	
		Preconserv		Preconserv		Preconserv
Jan		0		0		0
Feb		0		0		0
Mar		0		0		0
Apr		0		0		0
May		0		0		0
Jun		-340		-370		-320
Jul		-466		-374		-570
Aug		723		594		891
Sep		223		113		13
Oct		-140		37		-14
Nov		0		0		0
Dec		0		0		0
Annual difference (acre-ft)		**0**		**0**		**0**

UMDO (Umatilla River downstream of Dillon Diversion)

Flows at UMDO and any point along the Umatilla River upstream of UMDO and downstream of the Westland Diversion are the same for both the Preconservation Scenario and the No Action Alternative. Westland diverts any storage water that it releases for irrigation. Therefore, any changes in McKay storage releases are not realized downstream of the Westland Diversion and upstream of the Dillon Diversion. Live flow diversions at Westland are the same for both scenarios. Estimated flows at UMDO are shown in Table 7 for the No Action Alternative and the Preconservation Scenario and for wet, average, and dry years.

Table 7: Estimated mean flows at UMDO for wet, average, and dry years for the No Action Alternative and the Preconservation scenario.

	UMDO, Umatilla River downstream of Dillon Diversion (RM 24), average daily flows (cfs)					
	Wet year		Average year		Dry year	
Month	NA	Preconserv	NA	Preconserv	NA	Preconserv
Jan	1184.1	1184.1	596.1	596.1	597.9	597.9
Feb	2326.4	2326.4	651.3	651.3	289.4	289.4
Mar	1757.9	1757.9	1282.3	1282.3	879.7	879.7
Apr	1496.4	1496.4	1354.9	1354.9	760.8	760.8
May	772.6	772.6	515.7	515.7	512.4	512.4
Jun	138.7	138.7	227.5	227.5	157.4	157.4
Jul	5.8	5.8	55.9	55.9	22.2	22.2
Aug	4.1	4.1	26.7	26.7	7.2	7.2
Sep	36.7	36.7	76.1	76.1	43.1	43.1
Oct	182.5	182.5	194.0	194.0	156.4	156.4
Nov	408.0	408.0	250.3	250.3	298.4	298.4
Dec	694.9	694.9	323.4	323.4	667.4	667.4
Annual difference (acre-ft)		**0**		**0**		**0**

UMAO (Umatilla River at Umatilla)

Flows at UMAO could be affected by return flows from irrigated acreage and canal seepage losses from Westland, which will vary, depending on which scenario is in place. Generally, flows will be more at UMAO under the Preconservation Scenario when compared to the No Action Alternative, due to the returns from increased canal seepage. Most of the return flows return to the Umatilla River downstream of UMDO; therefore, any impacts to the river due to changes in return flows will potentially affect only the reach from UMDO to the mouth of the Umatilla River. Estimated flows at UMAO are shown in table 8 for

the No Action Alternative and the Preconservation Scenario and for wet, average, and dry years. Table 9 shows mean volume differences between the scenarios.

Table 8: Estimated mean flows at UMAO for wet, average, and dry years for the No Action Alternative and the Preconservation scenario.

	UMAO, Umatilla River at Umatilla (RM 2.2), average daily flows (cfs)					
	Wet year		Average year		Dry year	
Month	NA	Preconserv	NA	Preconserv	NA	Preconserv
Jan	1368.5	1371.9	667.1	670.7	530.9	534.3
Feb	2695.2	2698.0	688.4	691.4	341.6	344.4
Mar	1942.1	1944.4	1285.5	1287.9	917.4	919.5
Apr	1496.7	1499.1	1288.9	1291.4	702.9	705.5
May	1224.6	1227.8	451.1	455.1	605.8	609.5
Jun	201.1	205.3	240.2	245.4	219.0	223.6
Jul	15.5	21.5	65.7	72.3	28.6	34.7
Aug	40.6	48.2	54.6	62.5	33.0	40.6
Sep	123.0	132.4	136.1	145.2	107.4	116.9
Oct	275.9	284.4	243.7	251.3	233.0	241.0
Nov	496.2	502.3	297.6	303.4	366.0	371.9
Dec	870.4	874.9	365.2	369.5	678.8	683.1
Annual Difference (acre-ft)		**3654**		**3752**		**3665**

Table 9: Mean volume differences at UMAO for wet, average, and dry years for the Preconservation Scenario when compared to the No Action Alternative

	UMAO, Umatilla River at Umatilla (RM 2.2), volume differences (acre-ft)					
	Wet year		Average year		Dry year	
Month		Preconserv		Preconserv		Preconserv
Jan		208		224		205
Feb		156		168		155
Mar		139		149		134
Apr		142		154		150
May		199		246		231
Jun		251		307		270
Jul		368		404		372
Aug		471		486		469
Sep		557		542		561
Oct		523		467		494
Nov		364		343		355
Dec		276		262		269
Annual difference (acre-ft)		**3654**		**3752**		**3665**

MCKO (McKay Creek below McKay Reservoir)

Estimated flows at MCKO, which is downstream of McKay Reservoir, are shown in table 10 for the No Action Alternative and the Preconservation Scenario and for wet, average, and dry years. Table 11 shows mean volume differences between the scenarios. The differences in flows at MCKO are due to differences in the magnitude and timing of McKay storage water releases.

Table 10: Estimated mean flows at MCKO for wet, average, and dry years for the No Action Alternative and the Preconservation scenario.

	MCKO, McKay Creek below McKay Reservoir, average daily flows (cfs)					
	Wet year		Average year		Dry year	
Month	NA	Preconserv	NA	Preconserv	NA	Preconserv
Jan	45.7	45.7	10.1	10.1	10.1	10.1
Feb	186.7	186.7	10.0	10.0	10.0	10.0
Mar	246.6	246.6	10.1	10.1	10.1	10.1
Apr	230.7	230.7	118.4	118.4	23.3	23.3
May	260.4	260.4	58.1	58.1	66.4	66.4
Jun	179.3	173.6	175.4	169.2	214.2	208.8
Jul	191.9	184.3	197.9	191.8	209.1	199.8
Aug	203.5	215.3	171.5	181.1	180.4	194.9
Sep	155.3	159.1	140.8	142.7	146.2	146.4
Oct	149.4	147.1	145.3	145.9	144.3	144.1
Nov	24.2	24.2	87.5	87.5	51.9	51.9
Dec	10.1	10.1	10.4	10.4	10.1	10.1
Annual Difference (acre-ft)		**0**		**0**		**0**

Table 11.—Mean volume differences at MCKO for wet, average, and dry years for the Preconservation Scenario when compared to the No Action Alternative

Month	MCKO, McKay Creek below McKay Reservoir , volume differences (acre-ft)					
	Wet year		Average year		Dry year	
		Preconserv		Preconserv		Preconserv
Jan		0		0		0
Feb		0		0		0
Mar		0		0		0
Apr		0		0		0
May		0		0		0
Jun		-340		-370		-320
Jul		-466		-374		-570
Aug		723		594		891
Sep		223		113		13
Oct		-140		37		-14
Nov		0		0		0
Dec		0		0		0
Annual difference (acre-ft)		**0**		**0**		**0**

Summary

The results of modeling the Preconservation Scenario have shown that conservation activities, which occurred in Westland, have reduced return flows to the Umatilla River. Comparison of the Preconservation Scenario to the No Action Alternative also shows that there are other minor differences in the magnitude and timing of flows. These differences are shown in the following locations along the Umatilla River and in McKay Creek below McKay Reservoir:

Upstream of the Westland diversion: Impacts in the Umatilla River are due to differences in the timing and magnitude of storage water releases from McKay Reservoir. These differences reflect the different management scenarios of the modeled scenarios. The impacts are monthly variations that occur during the irrigation season. Annually, there are no differences between the scenarios.

Downstream of Dillon diversion: Impacts in the Umatilla River are a result of differences in the timing and magnitude of return flows from Westland. Average annual modeled return flows were around 3,690 acre-feet higher for the Preconservation Scenario.